variation of specific heat at constant volume of various gases with density; (*b*) Iolite in the Granites of Leinster; (*c*) a heterogeneous Beryl Felspar mineral; (*d*) the reversal of *Oldhamia antiqua* and *radiata* impressions in the Slates of Bray Head. Is the author, amongst other papers, of the following:—"On the direct experimental determination of Specific Heats of Gases at Constant Volume" (Proc. Roy. Soc., vol. xlviii., in abstract, recommended for Phil. Trans.); "On the Method of Condensation in Calorimetry" (Proc. Roy. Soc., vols. xlv. and xlvii.); "On the Specific Heats of Minerals" (*ibid.*, vol. xli.); "Observations of Spark Discharge over Surfaces of Dielectrics" (*ibid.* vol. xlvii.); "On the Volcanic Ash of Krakatoa" (Proc. Roy. Dubl. Soc., vol. iv.). Has invented (*a*) the Method of Steam Calorimetry (Trans. and Proc. Roy. Soc., as above); (*b*) a Diffusion Photometer (*Phil. Mag.*, July 1888); (*c*) a Hydrostatic Balance (*ibid.*, Sept. 1888); (*d*) an Instrument for measuring Melting and Boiling Points of Solids, &c., up to a very high temperature (NATURE, vol. xxxiii., and *Industries*, vol. vi.); (*e*) a Method of measuring the Density of a Gas (*Phil. Mag.*, vol. xxx.); (*f*) a Method of reading Distant Meteorological Instruments (Proc. Roy. Dubl. Soc., vol. iv.); (*g*) a Method of measuring Specific Gravities of Minute Quantities of Porous and other Solids (*Phil. Mag.*, July 1888.

JOSEPH LARMOR, M.A.,

D.Sc. Fellow of St. John's College, Cambridge. University and College Lecturer in Mathematics. Senior Wrangler, 1880. Formerly Professor of Mathematics Queen's College, Galway. Fellow of the Royal University of Ireland. Examiner in Mathematics at the University of London. Author of the following papers:—"Application of Generalized Space Coordinates, Potentials, and Isotropic Elasticity" (Trans. Camb. Phil. Soc., vol. xiv.); "Least Action" (Proc. Lond. Math. Soc., vol. xv.); "Flow of Electricity in Linear Conductors" (*ibid.*, vol. xvi.); "Characteristics of an Asymmetric Optical Combination" (*ibid.*, vol. xx.); "Electro-magnetic Induction in Conducting Sheets and Solid Bodies" (*Phil. Mag.*, 1884); and other papers on Pure and Applied Mathematics.

LOUIS C. MIALL,

Professor of Biology in the Yorkshire College. Prof. Miall has published the following papers and books:—Reports on Labyrinthodonts (Rep. Brit. Assoc., 1873-74): the first translated as introduction to S. Anton Fritsch's "Fauna der Permformation Böhmens"; Fossil Teeth of Ceratodus (Palæont. Indica); Sirenoid and Crossopterygian Ganoids, Part I. (Palæont. Soc.); papers on Labyrinthodonts, Rhizodus, Ctenodus, and Megalichthys (Quart. Journ. Geol. Soc.): Studies in Comparative Anatomy: I. Skull of Crocodile, II. Anatomy of the Indian Elephant (jointly with F. Greenwood), III. The Cockroach (jointly with H. Denny); Vertebrate Palæontology in Geol. Record (Sub-editor). In 1875 received the Wollaston Donation from the Geological Society.

BENJAMIN NEVE PEACH,

F.R.S.E., F.G.S. District Surveyor of the Geological Survey of Scotland. Past President of the Physical Society of Edinburgh. Recipient of the Wollaston Donation Fund of the Geological Society in 1887. For thirty years actively engaged on the Geological Survey, during which time he has mapped many of the most complicated districts of Scotland. Has charge of the surveying of the North-West Highlands, and has taken the leading part in unravelling the remarkable structural complications of that region. Author of various papers on palæontological subjects:—"On some New Crustaceans from the Lower Carboniferous Rocks of Eskdale and Liddesdale" (Trans. Roy. Soc. Edin., vol. xxx., p. 73); "On some new species of Fossil Scorpions from the Carboniferous Rocks of Scotland" (*ibid.*, p. 399); "Further Researches among the Crustacea and Arachnida of the Carboniferous Rocks of the Scottish Border" (*ibid.*, p. 511); "On some Fossil Myriapods from the Lower Old Red Sandstone of Forfarshire" (Proc. Roy. Phys. Soc. Edin., vol. vii. p. 179). Joint author with Mr. J. Horne of many papers on stratigraphical and physical geology, including:—"The Glaciation of the Shetland Isles" (Quart. Journ. Geol. Soc., vol. xxxv. p. 778); "The Glaciation of the Orkney Islands" (*ibid.*, vol. xxxvi. p. 648); "The Old Red Sandstone of Shetland" (Proc. Roy. Phys. Soc. Edin., vol. v. p. 30); "The Glaciation of Caithness" (*ibid.*, vol. vi. p. 316); "Report on the Geology of the North-West of Sutherland" (NATURE, vol. xxxi. p. 31); "The Old Red Sandstone Volcanic Rocks of Shetland" (Trans. Roy. Soc. Edin., vol. xxxii. p. 539); "Report on the Recent Work of the Geological Survey in the North-West Highlands of Scotland, based on the Field Maps of B. N. Peach, J. Horne, W. Gunn, C. T. Clough, L. Hinxman, and H. M. Cadell" (Quart. Journ. Geol. Soc., vol. xliv. p. 378).

ALEXANDER PEDLER,

F.C.S., F.I.C., Fellow of the University of Calcutta; Professor of Chemistry, Presidency College, Calcutta; Meteorological Reporter to the Government of Bengal; and Curator of the Bengal Government Museum at Calcutta. Author of papers on "An Isomeric Modification of Valeric Acid," "Calcutta Coal Gas," "The Use of the Radiometer as a Photometer," "Cobra Poison," "The Past and Present Water Supplies of Calcutta," "Technical Education for Bengal," "The False Point Cyclone of September 22, 1885," published in the Proc. Roy. Soc., the Journ. Chem. Soc., the Journ. Asiat. Soc. Beng., and elsewhere.

AUGUSTUS D. WALLER, M.D.,

Lecturer on Physiology at St. Mary's Hospital Medical School. Distinguished as a Physiologist. Lauréat de l'Institut de France (Prix de Physiologie Expérimentale). Contributions to the Royal Society:—"On the Influence of the Galvanic Current on the Excitability of the Motor Nerves of Man" (with Dr. de Watteville, Phil. Trans., 1882); "On the Influence of the Galvanic Current on the Excitability of the Sensory Nerves of Man" (Roy. Soc. Proc., 1882); "On the Action of the Excised Mammalian Heart" (with Dr. Reid, Phil. Trans., 1887); "On the Electromotive Changes connected with the Beat of the Mammalian Heart" (Phil. Trans., 1889). Contributions to the *Journal of Physiology*:—"On the Rate of Propagation of the Arterial Pulse Wave" (vol. iii., 1880); "A Demonstration in Man of Electromotive Changes accompanying the Heart's Beat" (vol. viii., 1887) Contributions to other journals, English and foreign:—"Die Spannungen in den Vorhöfen des Herzens" (*Arch. f. Anat. u. Physiol.*, 1878); "On Muscular Spasms known as Tendon Reflex" (*Brain*, 1880); "Nouvelles Expériences sur les Phénomènes nommés Réflexes tendineux" (with Dr. Prévost, *Rev. Méd. de la Suisse Romande*, 1881); "Sur la Contraction de l'Ouverture" (*Journ. de Physiol.*, 1882), &c.

NOTES.

THE Council of the British Association for the Advancement of Science have nominated Dr. J. S. Burdon Sanderson, F.R.S., Waynflete Professor of Physiology in the University of Oxford, President for the meeting of the Association which will be held next year at Nottingham. Dr. Sanderson has accepted the nomination.

THE Gold Medal of the Linnean Society has this year been awarded by the Council to Dr. Alfred Russel Wallace for his important contributions to the literature of zoology. The medal will be presented at the forthcoming anniversary meeting of the Linnean Society, to be held at Burlington House on the 24th inst.

WE regret to have to record the death of the illustrious chemist, August Wilhelm Hofmann. He died on May 5. Prof. Hofmann was well known in England, where he spent many of his best years. On Liebig's recommendation he was appointed in 1848 Superintendent of the Royal College of Chemistry, in London. This institution, which made great progress under his care, was in 1853 merged in the Royal School of Mines as the Chemical Section. He became a Warden of the Royal Mint in 1855. In 1864 he accepted the chair of chemistry at Bonn, and in the following year he was called to Berlin, where he spent the rest of his life as Professor of Chemistry. He made many contributions to the *Annalen der Chemie*, to the Transactions of the Chemical Society, and to the Philosophical Transactions of the Royal Society, of which latter institution he was made a Fellow in 1851, in recognition of his services to science. In 1854 he was awarded a Royal Medal for his "Memoirs on the Molecular Constitution of the Organic Bases." Some of his discoveries led to industrial results of the highest importance. The high respect in which Prof. Hofmann was held in Germany was shown at his funeral, which took place on Monday. It was very largely attended, and, according to the Berlin correspondent of the *Standard*, "was in all respects worthy of a prince of science." The correspondent says:—"The Empress Frederick, immediately on receiving the news of the Professor's death, telegraphed to his widow, 'My deepest sympathy in your great, your irreparable loss. I am deeply shocked by the quite unexpected news of your dear husband's death.' Her Imperial Majesty sent a splendid laurel wreath bearing her initials, to be placed on the coffin, and a Court Chamberlain represented Her Majesty at the funeral. The Minister of Education and numerous officials of his Department, all the members of the Berlin Academy, and almost all the professors and students of the University, accompanied the funeral procession to the cemetery."

WE regret also to have to announce the death of Dr. James Thomson, F.R.S., Emeritus Professor of Civil Engineering in the University of Glasgow, Lord Kelvin's brother. Dr. Thomson died on Sunday last. He was seventy years of age.

THERE are vacancies for zoological students at the Cambridge University's tables in the Zoological Station at Naples, and in the Marine Biological Society's Laboratory at Plymouth. Applications are to be sent to Prof. Newton, Chairman of the Special Board for Biology and Geology, by May 30.

GENERAL ISAAC T. WISTER, President of the Philadelphia Academy of Sciences, has placed in the hands of trustees for the benefit of the University of Pennsylvania, 100,000 dollars for the erection of a Museum with laboratories, to contain the Wister and Horner Museum of Human and Comparative Anatomy. He has also given an endowment of 3000 dollars a year for the maintenance of a curator, whose occupation shall consist largely of original research.

WE referred lately to the interesting Horticultural Exhibition for which preparations were being made at Earl's Court. The Exhibition was formally opened on Saturday last by the Duke of Connaught, and promises to be a great success.

A GERMAN scientific expedition under Dr. Erich von Drygalski started from Copenhagen for West Greenland on May 1. Dr. von Drygalski is accompanied by Dr. H. Stade, the meteorologist, and Dr. E. Vanhöffen, the zoologist. They were to make in the first instance for Umanak Fjord. They do not intend to return until the autumn of 1893.

WE are glad to welcome a third edition of Clerk Maxwell's great "Treatise on Electricity and Magnetism" (Clarendon Press). The task of seeing the proofs through the press could not be undertaken by Mr. W. D. Niven, who had charge of the second edition; so the duty has been fulfilled by Prof. J. J. Thomson, who, we need scarcely say, has done his work admirably. Twenty years have passed since the work was written, and during that time the sciences of electricity and magnetism—thanks in part to the influence exerted by this treatise—have made rapid progress. Prof. Thomson explains that when he began to prepare the present edition he intended to give in foot-notes some account of the advances made since the publication of the first edition, not only because he thought it might be of service to students, but because all recent investigations have tended to confirm in the most remarkable way Maxwell's views. He soon found, however, that if this intention were carried out the book would be disfigured by a disproportionate quantity of foot-notes. His notes have accordingly been thrown into a slightly more consecutive form, and will be published separately. A few foot-notes relating to isolated points which could be dealt with briefly are given. Prof. Thomson has added something in explanation of the argument in those passages in which he has found from his experience as a teacher that nearly all students find considerable difficulties. He has also attempted to verify the results which Maxwell gives without proof. He has not in all instances succeeded in arriving at Maxwell's results, and in such cases he has indicated the difference in a foot-note. Maxwell's method of determining the self-induction of a coil is reprinted from his paper on the dynamical theory of the electro-magnetic field.

AT the time of our last issue, an anticyclone lay over the whole of the British Islands and part of the Atlantic, with north and north-east winds of some force, under the influence of a depression existing over North Germany. Daily temperatures were, generally, considerably below the normal values; slight snow fell on the south coast on the morning of the 6th, and the grass thermometer fell as low as 18° on that night in London. The anticyclone afterwards moved southwards, while a depression, which had set in at the northern stations, spread towards the North Sea, the winds shifted to west and north-west, and temperatures gradually increased; the maxima exceeded 60° over the inland parts of England on Sunday, and even reached 70° at several stations on Monday, with fine weather generally. The amount of rainfall is considerably below the average. The Weekly Weather Report for Saturday last shows that the deficiency, since January 3, amounts to 7·7 inches in the west of Scotland and to 5·3 inches in the south-west of England. During the last few days this country has again been under the influence of an anticyclone, with fine, warm weather generally.

THE Pilot Chart of the North Atlantic Ocean, in its review of weather during April, says that the storms on the Atlantic, like those of the preceding month, were confined almost entirely to the American coast and the western part of the ocean, and they again followed somewhat abnormal northerly tracks. Two of the most severe storms whose tracks are plotted on the chart, occurred during the last few days of March. During the first week of April, pleasant anticyclonic weather prevailed along the American coast south of Hatteras, but two severe storms moved eastward over Labrador on the 3rd and 6th respectively, the first of which was followed by a storm of slight energy that formed south of Cape Race on the 4th, and the second by one that reached Hatteras from inland the morning of the 8th, but neither of these, nor those of the 9th to 11th, and 15th to 16th, along the Nova Scotia coast, were at all severe. The only remaining storms of any noteworthy severity, so far as indicated by data received at the office of the Pilot Chart up to date of publication, were those that originated between the Grand Banks and Bermuda on the 13th and 18th respectively. The track of a depression of considerable energy is indicated near the Azores on the 6th, 7th, and 8th, and another, but of slight energy only, in the English Channel on the 15th and 16th. The persistent anticyclonic weather over the British Isles and Central Europe during the last week of March and the first half of April, may be said to have turned to the northward the storms that formed over the ocean, and it seems probable that the persistent northerly winds thus caused off Labrador and Newfoundland helped along the ice that is now working its way southward off the Grand Banks. Fog has been reported in increasing quantities, also, and it will continue to increase until midsummer.

WE note the publication of two new monthly meteorological bulletins for Russia, which are issued nearly closely up to date, viz. by Prof. A. Klossovski, Odessa, with Russian and German next, and by Prof. P. Brounof, Kieff, in Russian, with a few notes in French. Both bulletins contain observations taken three times daily, with daily and monthly means, while the Odessa publication contains monthly rainfall values, and maximum and minimum temperatures for about a hundred stations in South-West Russia. The Kieff observations are preceded by some remarks (in Russian only) on the temperature and density of snow at various depths.

A REMARKABLE aurora borealis was seen at Moscow during the night of April 26–27. It began at 11.50 p.m. with a dark segment fringed by a bright border, the summit of which stood a few degrees to the west of the meridian. Bright rays were projected to the constellations of Auriga, Perseus, and Cassiopœia, while the longest rays reached the Pole star. It attained its maximum at 11.56, but four minutes later it began to die away, no traces of it being seen at 12.15 a.m. At 2 a.m. three beams of light appeared again for a few seconds. It is worthy of note that on April 26 a large accumulation of sun-spots was observed at Moscow; it consisted of ten groups of spots. It may also be added that another aurora borealis, much brighter than the above, was seen at Moscow on March 12, at 4 a.m. It lasted for nearly half an hour.

ALL who have occasion to use the magic lantern will be interested in the fact that a lantern may now be seen at the Crystal Palace finely illuminated by the arc-light. This instrument was designed by Mr. T. C. Hepworth, F.C.S., who uses it to illustrate lecture entertainments in connection with the Crystal Palace Electrical Exhibition. The lamp employed is the Brockie-Pell, which has been modified by Messrs. Newton to make it more suitable for the particular work required. It gives a pure white light, and its brilliance is said to be several times that of the lime-light. The electric arc-light has before been applied to lantern projection, but it is claimed that the Crystal Palace lantern is on quite an unprecedented scale.

M. MESDRAN, of Paris, sends us a prospectus, in which he sets forth the merits of a machine he has invented for the proper boiling of eggs. Hitherto, it seems, mankind have boiled eggs on a wholly false principle. M. Mesdran claims that he has solved the problem, and that his invention is nothing short of "a revelation both from the hygienic and the gastronomic point of view." The invention has been patented in England.

AN interesting trace of Palæolithic man has lately been discovered in Hermann's Cave in the Harz. Excavations were being carried on in the cave, under the superintendence of Herr Grabowsky, when a flint which had all the appearance of having been fashioned into the form of a knife was found among the remains of reindeer and other glacial or Arctic animals. The object could not have been brought into the cave by non-human means, as flint is not found anywhere in the neighbourhood. A paragraph on the subject appears in the current number of *Globus*, the editor of which appends a note to the effect that the flint (which lay before him as he wrote) has undoubtedly been artificially worked into its present shape.

DR. DANIEL G. BRINTON has issued an interesting pamphlet, in which he urges the claims of anthropology as a branch of University education. He gives an account of the aims and methods of the science, and then sketches a general scheme of anthropological instruction. Dr. Brinton would begin with lectures on somatology, including internal somatology, external somatology, psychology, and developmental and comparative somatology. Then would come ethnology, in connection with which he would deal with sociology, technology, religion, linguistics, and folk-lore. Under ethnography he would discuss the origin and subdivisions of races; and archæology he would divide into "general" and "special." Laboratory work would include (in the physical laboratory) such tasks as the comparing and identifying of bones, the measuring of skulls, &c.; and (in the technological laboratory) the study of stone and metal implements, textile materials, &c. There would also be library work and field work. Students who might wish to obtain an adequate notion of the science would have to attend a course of thirty or forty lectures, and give twice as many hours to laboratory work. That would be the minimum amount of study. Those who might desire to instruct others, or to prepare for independent research, would devote to the science the greater part of their time during two or three years.

THE structure of the cells of Bacteria continues to occupy the attention of biologists, and a communication on the subject to the St. Petersburg Society of Naturalists (*Memoirs*, vol. xxi., Botany), by W. K. Wahrlich, is worthy of notice. Careful study of several species of Bacteria has led the author to the conclusion that only two substances are to be detected in the cell—chromatin, and linin, which surrounds the former. The leading part in the formation of spores belongs to chromatin, which is used entirely for this purpose, while the linin substance is used for the formation of the exosporium. As to the involutional forms, the author can only confirm the opinions of De Bary, Nägeli, and Büchner as to their being representative of a pathological state, or of a degeneration of the cell; chromatin disappears in such cells, and two or three vacuoles appear in their linin part. The bacterial cells thus appear to be simple nuclei, surrounded by membranes, but devoid of cytoplasm; chromatin is their most important part, and when it disappears the cell can no longer reproduce itself or continue an independent life.

A REPORT was lately spread in the United States to the effect that the Government intended to introduce the mongoose in the West to exterminate the rodents which annoy farmers there. The editors of the *Naturalist* wrote to the Department of Agriculture for information on the subject, and received in reply a letter to the effect that no such "rash act" had ever been contemplated, the introduction of exotic species being contrary to the Department's policy. The *Naturalist* expresses cordial approval of this answer, evil having, it maintains, "invariably resulted from the introduction of exotic animals into countries when no adequate natural restriction to their increase exists."

MR. F. W. WARD was commissioned last year by the Hon. Sydney Smith, then Minister of Agriculture in New South Wales, to report upon the relations of fruit production in that colony to the English market. The report was presented some time ago, and is printed in the February number of the *Agricultural Gazette of New South Wales*. Mr. Ward is convinced that London offers an attractive market for the fruit products of Australasia in their green, dried, and canned forms. All testimony, and most emphatically that of the European growers, is, he says, to the effect that London is, and always will be, the great fruit market of the world. There is also, he adds, a consensus of opinion to the effect that Australasia will gain the largest share of the advantage in regard to this market, consequent upon the reversal of the seasons. Other territories in the southern hemisphere will dispute the market with Australasia; but Mr. Ward anticipates that the energy and intelligence of Anglo-Saxon communities, operating upon good and cheap soil, an unsurpassed, if not an unrivalled, climate for fruit production, and splendid facilities of over-sea carriage, will fully or more than compensate for the one great disadvantage of geographical distance. The London market for Australasian fruit resolves itself, for the most part, into a question of carriage. What needs to be done is to minimize the cost of conveying green fruit from (say) Sydney to London, and to solve the chemical problems attaching to the attempt to utilize the cool chambers of swift steam-ships in such a way as to preserve the appearance and flavour of so perishable a commodity as fruit through the unavoidable space of time and varying latitudes of the journey. Mr. Ward is of opinion that there are sound reasons for expecting that "these problems will be solved and that the market will be captured."

THE Echinoderm fauna of Kingston Harbour, Jamaica, seems to be remarkably numerous and varied. Mr. George W. Field, who has been investigating it, contributes some notes on the subject to the April number of the "Johns Hopkins University Circulars." About twenty-eight species of Echinoderms were found in Kingston Harbour and about the cays at its mouth, and a longer residence and dredging in the deeper waters would probably, Mr. Field thinks, have increased the number considerably. The difficulties of dredging were very considerable, arising in part from the nature of the bottom, from the unmanageableness of the boat, and chiefly from the wind. There always seemed to be a perfect calm or a gale; the calm periods between exceedingly short. However, considerable dredging was done by various members of his party. The surface tow-net showed a wonderful richness of the larval Echinoderms in the pelagic fauna, chiefly however, during their stay, confined to Ophiurid, Echinid, and Spatangid plutei, the relative abundance being in the order named. During the month of June they were abundant, and in early July they were extremely numerous. They were found in greatest numbers in tows made about sunrise. In the evening towing they were invariably absent. These larvæ, says Mr. Field, appear to come to and remain at the surface from midnight until about sunrise; after that to gradually disappear until three hours after sunrise, when they are rarely found at the surface. Their appearance seemed to be little or not at all influenced by the tide, but did depend very much upon the quantity of flood water poured into the harbour by the various rivers. In its general aspect the Echinoderm fauna shows no very considerable variation from that of the Bahamas and Southern Florida, though apparently richer in species and in individuals.

ACCORDING to an official report published in the *Deutsches Kolanialblatt* for April, the Germans have every reason to be satisfied with the way in which the resources of Cameroon are being developed. The industry and trade of the colony are said to be in a flourishing condition. The chief products are palm oil and palm kernels. There are many elephants in the territory, and ivory is still exported. Caoutchouc is also obtained in considerable quantities, and ebony fetches good prices. In 1891 there were in Cameroon 166 Europeans, of whom 10 were women. There were 109 Germans and 31 Englishmen. The exact number of natives is not yet known, but it is calculated that there are 20,000 Dualla on the Cameroon river, 25,000 Bakwiri in the Cameroon Highlands, and 20,000 Bamboko towards the west of the hilly district.

A VALUABLE paper presenting a revision of the American species of Rumex occurring north of Mexico, by William Trelease, appears in the third annual report of the Missouri Botanical Gardens, and has also been issued separately. Rumex is a genus which has been held to include from 100 to about 130 species, the greater part of which belong to the north temperate region of both continents. "Of the twenty-one species," says Mr. Trelease, "recognized by me as occurring within our flora, eleven were characterized and named by Linnæus in the first edition of the 'Species Plantarum,' and only five have been named by American botanists." The biological interest of the genus arises chiefly, as he points out, from the protective acidity of the sorrels and some docks, and the occurrence of tannin and a bitter principle in others; their protandry and exclusive adaptation to wind pollination; and the adaptation of the greater number of species to wind dissemination, by the enlargement of the inner segments of the perianth during ripening, although some of those with fimbriate valves may profit by attachment to animals.

IN the latest instalment of the Proceedings of the Academy of Natural Sciences, Philadelphia, Messrs. H. Skinner and L. W. Mengel give an account of some of the insects taken by the expedition which the Academy sent to Greenland in 1891. The insects captured were divided among the different orders as follows:—Hymenoptera 25 specimens, Coleoptera 4 specimens, Lepidoptera Rhopalocera 143 specimens, and Heterocera 143. They were captured by Mr. L. W. Mengel, entomologist to the expedition, and Dr. W. E. Hughes, ornithologist. The specimens are all from the West Coast, and were taken at three principal localities, McCormick Bay, Herbert Island, and Disco.

ACETYL FLUORIDE, CH_3COF, has been prepared by M. Maurice Meslans, and is described by him in the current number of the *Comptes rendus*. As was to be expected, it is a substance considerably more volatile than acetyl chloride. Its boiling-point is 19°·5, very near that of hydrofluoric acid itself, and hence upon a warm day it takes the form of a gas, while at temperatures below 19°·5 it assumes the liquid state. It has been prepared by M. Meslans by causing various inorganic fluorides to react upon acetyl chloride. Thus when silver fluoride and acetyl chloride are heated together in a sealed tube to 260°, a small quantity of acetyl fluoride is formed. The acetyl chloride, however, is much more completely converted to fluoride when it is passed in the state of vapour through a long silver tube filled with dry silver fluoride and heated to 300°. Upon allowing the issuing vapour to pass into a strongly cooled receiver, acetyl fluoride condenses in the liquid form. Another mode of preparation consists in allowing arsenic fluoride to fall drop by drop upon acetyl chloride contained in a copper vessel, when energetic action at once occurs in the cold. The exit tube is attached to a spiral of leaden tubing, arranged as an inverted condenser, in order to retain either of the liquid reacting substances, and the last traces of acetyl chloride are removed by subsequently allowing the escaping vapour to pass through a copper U-tube filled with fragments of silver fluoride and heated in a bath of nitrates to 300°. The acetyl fluoride may then be condensed in a strongly cooled receiver. Instead of arsenic fluoride the solid trifluoride of antimony may be employed, and the operation performed in a glass flask, an ordinary inverted glass condenser being used to retain any escaping acetyl chloride. By far the most advantageous mode of preparation, however, consists in reacting with acetyl chloride upon zinc fluoride. One hundred grams of zinc fluoride are introduced in successive portions of ten grams each into a strong glass flask cooled by a freezing mixture and containing a hundred and fifty grams of acetyl chloride. The flask is then sealed, warmed to 40°, and again cooled. It is subsequently opened, while surrounded by the freezing mixture, and placed in connection with a leaden worm whose extremity passes down into a second flask surrounded by ice and containing a little dry zinc fluoride. The acetyl fluoride is then distilled over into the second flask, and upon redistillation over the zinc fluoride contained in the flask it is obtained in an almost pure condition. The liquid may be preserved unchanged in a dry glass vessel, but if moisture obtains access the glass is rapidly attacked. If the vessel containing the liquid is placed in connection with a tube standing over mercury, and the liquid warmed by holding the vessel in the hand, the new fluoride may be collected in the gaseous state, and preserved as a gas, provided the temperature of the room is superior to 19°·5. Both the liquid and the gas are colourless.

They burn with a blue flame upon ignition, producing water vapour, carbon dioxide, and hydrofluoric acid. They possess an odour somewhat resembling that of carbonyl chloride. Water dissolves about twenty times its volume of the gas, but the liquid does not mix with water, a very small proportion only being dissolved, and suffering slow decomposition. Alcohol, ether, benzene, and chloroform dissolve it in all proportions.

The additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♂) from India, presented by Mr. C. Drew; a Grivet Monkey (*Cercopithecus griseo-viridis* ♀) from North-east Africa, presented by Mr. George Conquest; a Grey Ichneumon (*Herpestes griseus*), from India, presented by Mr. J. E. Barber; a Common Fox (*Canis vulpes* ♀), British, presented by Miss Nora Dunn; a Song Thrush (*Turdus musicus*), British, presented by Mr. Baldwin M. Smith; an Alexandrine Parakeet (*Palæornis alexandri* ♂) from India, presented by Mr. E. Bond; two Cerastes Vipers (*Vipera cerastes*) from Egypt, presented by Colonel Holled Smith; a —— Lizard (*Amphibolurus* sp. inc., from Australia, presented by Mr. Herbert E. Swayne; a Guinea Baboon (*Cynocephalus sphinx* ♀) from West Africa, a Rhesus Monkey (*Macacus rhesus* ♂), a Grey Ichneumon (*Herpestes griseus*) from India, two Punctated Agoutis (*Dasyprocta punctata*), a King Vulture (*Gypagus papa*) from Central America, a White-eyebrowed Guan (*Penelope superciliaris*) from South-east Brazil, deposited; a White-faced Heron (*Ardea novæ-hollandiæ*) from Australia, eight Ruffs (*Machetes pugnax* 4 ♂ 4 ♀), British, purchased; a Reindeer (*Rangifer tarandus* ♀) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Photographic and Visual Magnitudes of Stars.—At the Amsterdam Academy of Sciences on April 2, Prof. J. C. Kapteyn communicated the results of an investigation on the systematic differences between the photographic and visual magnitudes of stars in different regions of the sky. The comparison of the photographic diameters of stars of equal visual magnitude (according to Gould and Schonfeld's estimations) on 370 plates of the southern sky, shows that the actinic effect of stars in or near the Milky Way is much greater than that of stars in high galactic latitudes. Prof. Kapteyn has examined the different causes which lead to this variation. There is, first of all, the influence of different meteorological conditions; next, systematic errors in the catalogue of visual magnitudes used for comparison; and thirdly, peculiarities in the light of the stars. The discussion leads to the conclusion that the difference of magnitude is not appreciably affected by the first of these causes. And since, taking everything into consideration, the errors of estimated visual magnitudes could not possibly exceed 0·3 magnitude, there is no doubt that the difference of half a magnitude or more, indicated by the photographs, is due to the quality of light emitted. It is said that Prof. Pickering's idea that the Milky Way ought to be considered as an aggregation of stars of the first type is only sufficient to account for a difference of about 0·1 magnitude. Thus it appears that the light of stars in or near the Milky Way, like those of Group IV., is richer in violet rays than that of other stars.

Photographs of the Lyra Ring Nebula.—In addition to the work on the Carte du Ciel, Prof. Denza, of the Vatican Observatory, has taken up the photography of nebulæ. Beginning with the Ring Nebula in Lyra, he has made five exposures on this object, from half an hour up to nearly two hours' duration. To bring out the fine detail, development has been carried on for about twenty minutes in each case. The negative which had received the longest exposure was presented to the Paris Academy on April 25. Viewed microscopically, the star at the centre of the nebula is seen to be joined to a smaller one near the nebulosity, and each of them can be broken up into other more or less brilliant points. A large number of condensed regions are well visible in the nebula. The location of these leads Prof. Denza to agree with Secchi that "L'anneau se prolonge dans le sens du plus grand axe, et que les parties les plus denses sont dans la direction du petit axe."

Determination of the Constant of Aberration.—Prof. G. C. Comstock contributes the provisional results of a determination of the constant of aberration to the *Astronomical Journal*, No. 261. The method adopted in the investigation is a modified form of that used by M. Lœwy, three reflecting surfaces being placed in front of the objective of the telescope instead of two. Images of stars in different portions of the heavens are thus simultaneously produced in the focal plane of the objective, and a micrometer is used to measure the distance between those of two given stars, when each pair of surfaces is successively employed. Then, if d represent the distance between the images of two stars as measured with the micrometer, Δ the angle subtended at the earth by the stars, R the effect of refraction in changing the true Δ into an apparent Δ', and K a correction depending upon the squares of the errors of adjustment of the mirrors, we have—

$$\Delta = 120^\circ + K + d + R.$$

The provisional value of the aberration constant derived from Prof. Comstock's observations is—

$$20''\cdot494 \pm 0''\cdot017.$$

An investigation of the refraction has also been made, resulting in the detection of a real variation. The refraction is at a maximum near the time of the winter solstice and a minimum near the summer solstice, but the exact epoch and amplitude have not yet been determined.

Star Magnitudes.—"The Estimation of Star Magnitudes by Extinction with the Wedge," was the subject of an interesting paper by Captain Abney before the Royal Astronomical Society, many of the experiments from which his conclusions were drawn being made from a paper which he and General Festing communicated to the Royal Society on colour photometry. In the experiment for determining the amount by which the intensity of any ray of the spectrum would have to be reduced before it became invisible, the absolute intensity of the D line was fixed upon for the basis, from which all the other intensities could be directly calculated. With the arrangement he described, the D line was reduced to the 350 ten-millionths part of a standard amyl lamp, while under the same conditions the green light E had to be reduced to 65, F to 150, G to 3000, and the red to 110,000 ten-millionths part. By making the rays equal to one amyl lamp the numbers obtained were for D 350, E 35, F 17, G 15, and for C 22,000 ten-millionths part.

These numbers showed that to produce extinction for two lights of equal luminosity, say of colours C and G respectively, the latter was nearly 1500 times greater than that required for the other. He then referred to the extreme persistency of the violet sensations, they being 1500 times more persistent than the red and about 25 times more than the green, pointing out that the violet sensation would be the last to be extinguished. The function of the wedge, then, was not to obliterate the spectrum but to eliminate the violet sensation contained in its light. By determining star magnitudes by this method of extinction, the results obtained, he says, "should agree better with those obtained by photography than those obtained by eye estimation," the first being obtained by estimation of the E light, the second of the light between G and F, and the third from that near D.

Referring to colour extinction he mentions that although most of the faint stars are known to be of a bluish colour it does not follow that "they are not red." The blue tint is brought about by the faintness of the light, which makes all colours appear grey, and "as the violet sensation disappears last, it frequently happens that you get the red and green sensations as grey, and the violet just above the colour limit, thus giving a grey blue." He suggests that with telescopes of large aperture these stars might be seen in colours.

THE INSTITUTION OF MECHANICAL ENGINEERS.

An ordinary general meeting of the Institution of Mechanical Engineers was held on the evenings of Thursday and Friday of last week. There were two items of exceptional interest on the programme, the first being the inaugural address